



BACKGROUND

The California Department of Water Resources (DWR) and U.S. Bureau of Reclamation (Reclamation) are proposing the Yolo Bypass Salmonid Habitat Restoration and Fish Passage (YBSHRFP) Project to improve fish passage and to increase floodplain rearing habitat for juvenile salmonids in the Yolo Bypass and lower Sacramento River basin. DWR and Reclamation are jointly planning the YBSHRFP Project to comply with the Reasonable and Prudent Alternative (RPA) actions I.6.1 and I.7, as described in the 2009 National Marine Fisheries Service (NMFS) Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project.

The YBSHRFP Project would modify the existing Fremont Weir to allow for improved hydraulic connection between the Sacramento River and the Yolo Bypass. In addition, one downstream agricultural road crossing would be modified to allow for improved fish passage within the Yolo Bypass Tule Canal.

DWR and Reclamation released a public draft of the Environmental Impact Statement /Environmental Impact Report (EIS/EIR) in December 2017. DWR and Reclamation created the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project Data Viewer (Data Viewer) as a platform to view modeled results of how increased flows may affect inundation within the Yolo Bypass. The Data Viewer is publicly accessible and provides hydrodynamic modeling results and maps for any selected assessor parcel in the Yolo Bypass.

MODEL DEVELOPMENT

A combined 1D/2D hydrodynamic model representing the Yolo Bypass, neighboring streams, and portions of the Sacramento, Feather, and American rivers was developed using TUFLOW modeling software. The main model inputs include elevation data, Manning roughness coefficients, discharges entering the model domain, and the tidal condition at the downstream boundary. The model also includes pertinent hydraulic structures, such as the Fremont Weir, Sacramento Weir, and the Lisbon Weir.

Light Detection and Ranging (LiDAR) data represent the above water terrain and are supplemented by bathymetric surveys for under water terrain. The model computes energy losses based on Manning roughness coefficients, which are assigned based on vegetation mapping data prepared by the California State University, Chico. Average daily discharges are used as the boundary conditions at the upstream boundaries, which are based on gauge data and estimated when data are not available. Water surface elevations sampled on a 15-minute interval are used as a boundary condition at the downstream boundary incorporating tidal effects in the model. The model is calibrated to three events representing a high flow condition, a low flow condition, and a receding flood condition. The below figure shows the model domain and the boundary conditions where discharges were input ([Appendix D Hydrodynamic Modeling Report](#), DWR 2017).

DISCLAIMER

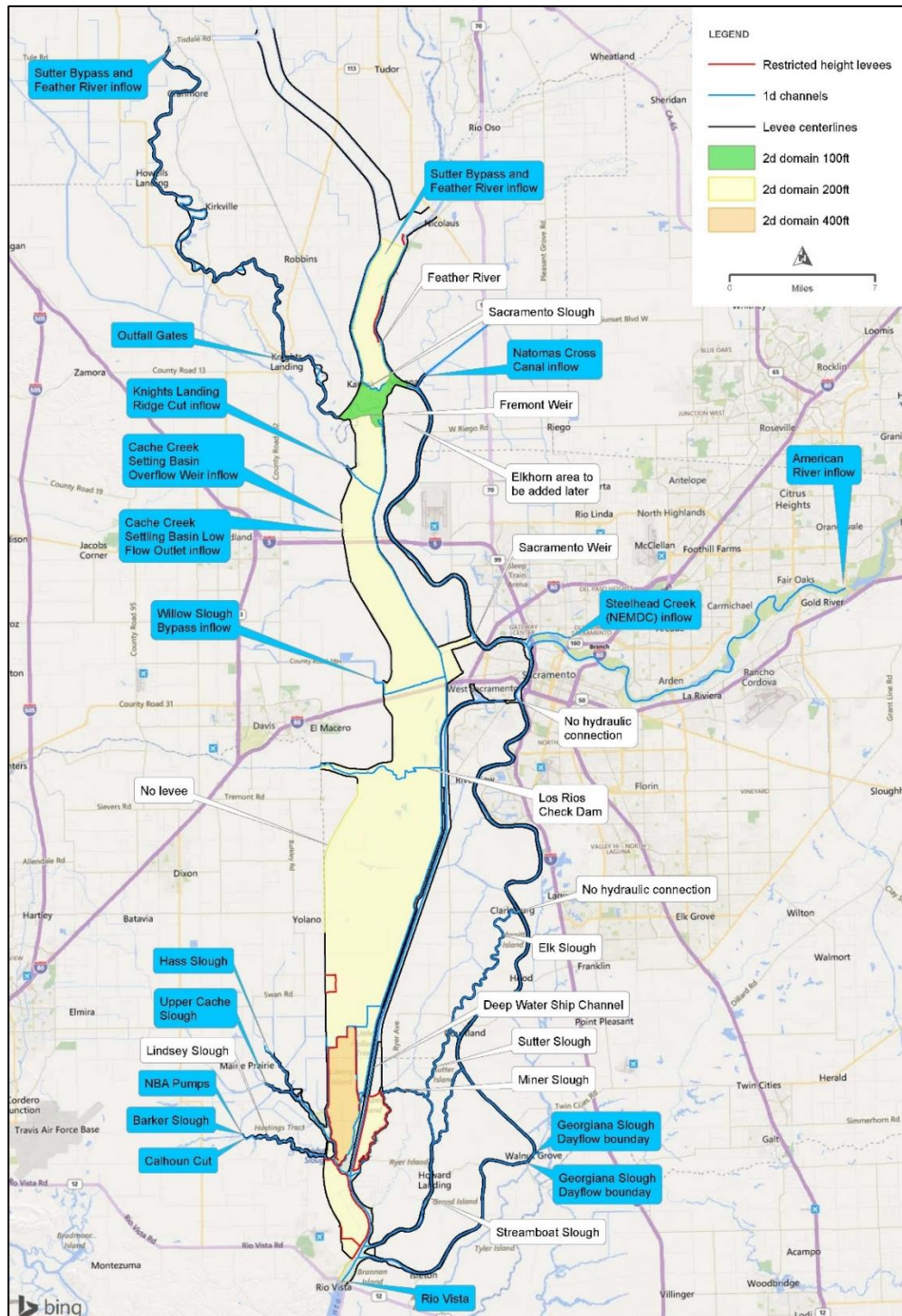
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YOLO BYPASS SALMONID HABITAT RESTORATION AND FISH PASSAGE PROJECT



DATA VIEWER



TUFLOW Model Overview

Blue callouts identify boundary conditions used in the model.

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DATA VIEWER

The TUFLOW model developed for the YBSHRFP Project does not represent managed inundation for any purpose be it recreational or agricultural. For example, duck clubs may have water flooded to a depth of 18 inches prior to any existing runoff or project discharge entering onto the property. This condition is not captured in the modeled results.

ALTERNATIVES ANALYZED

Components	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
Maximum discharge through gated notch before Fremont Weir overtops (cfs)*	6,000	6,000	6,000	3,000	3,400	12,000
Gated notch and channel location along Fremont Weir	East	Central	West	West	Central (multiple)	West
Supplemental fish passage location along Fremont Weir	West	West	East	East	West	East
Downstream channel improvement	X	X	X	X		X
Agricultural Road Crossing 1 improvements	X	X	X	X	X	X
Tule Canal water control structures				X		
Tule Canal floodplain improvement (program-level)					X	
Gate closure date for inundation flows	March 15	March 15	March 15	March 7 or March 15	March 15	March 15

*cfs: cubic feet per second

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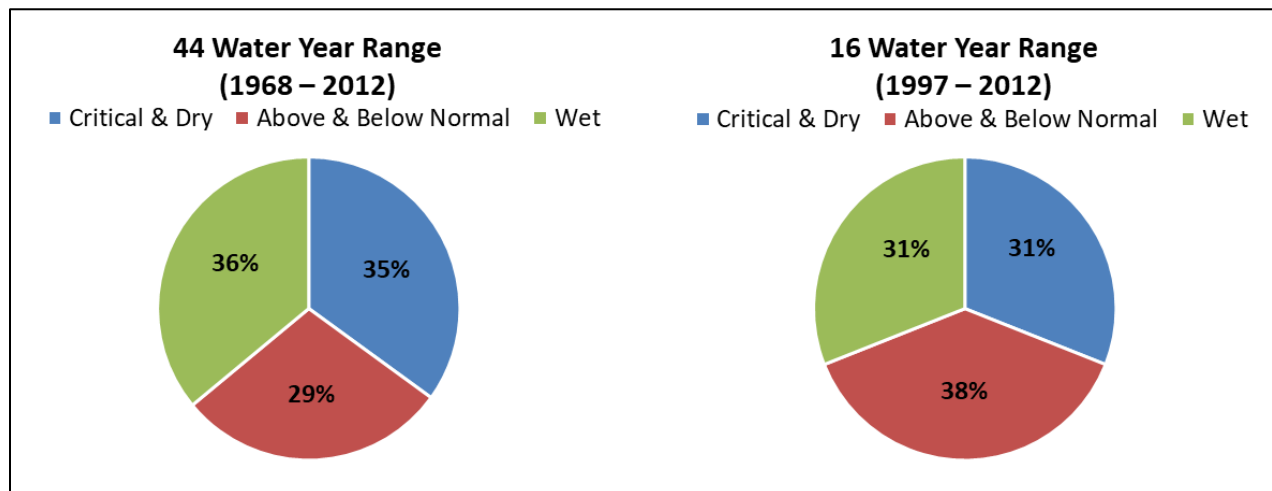
DATA VIEWER

WATER YEARS ANALYZED (1997 – 2012)

For model analyses, a subset of water years with available boundary condition data was analyzed to reduce the number of model simulations and computing time necessary. A model simulation was required for each combination of alternatives and water years and required multiple days for the 2D hydrodynamic model to process.

There are 44 water years (1968 through 2012) that have sufficient boundary condition data and adequately represent the existing system. Sixteen water years (1997 through 2012) were selected as a practical limit to the number of water years that could be included in the analyses. These years were selected because they resemble a similar classification as the available 44 water years using the Sacramento Valley 40-30-30 Index (water year type) developed by the State Water Resources Control Board (see figures below).

The 16 water years serve as an appropriate surrogate for the longer-term water year type across the historical 44 years of record. The 16 water years also provide the most recent 16 years of hydrology data that reflect recently built structures and operations of the system, as well as relatively recent climate trends.

**PROJECT PARTNERS**

DWR and Reclamation would like to thank cbec eco engineering and HDR for developing the TUFLOW model and analyzing the selected alternatives for the YBSHRFP Project. DWR and Reclamation would also like to thank ESRI for developing the Data Viewer to help illustrate how project alternatives may affect inundation within the Yolo Bypass.

QUESTIONS

If you have questions or comments regarding the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project Data Viewer, please contact Yolo_Bypass_BiOp@water.ca.gov.

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